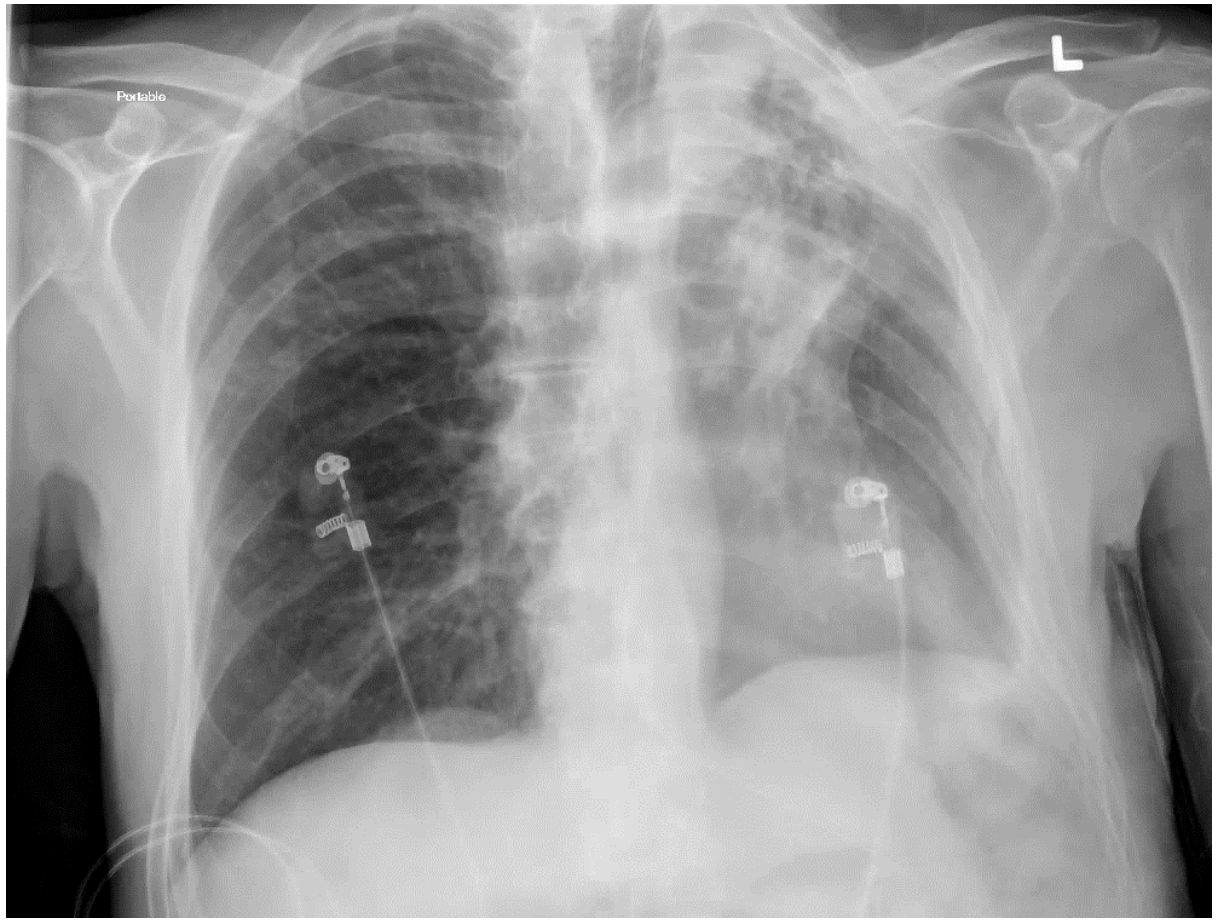
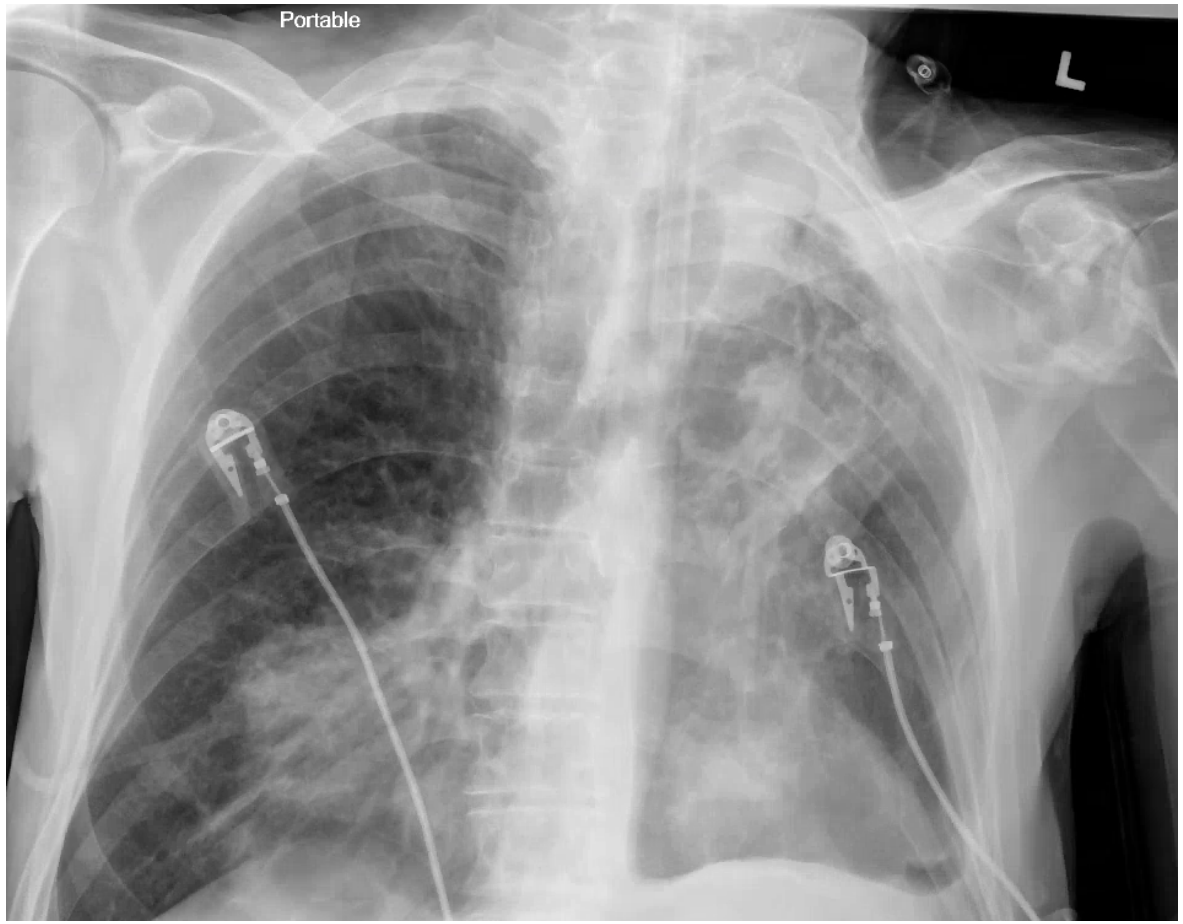
Case Presentation

- 74 year old male with history of lung/esophageal CA (7 years ago, s/p resection of partial left lung, vocal cord and esophagus, chemo/rad), CVA (last admitted to DMC 02/2020) DM, HTN, PVD was brought from NH with altered mental status, fever, hypotension and tachycardia.
- ED course: Hypotensive to 90/50 with tachycardia to 120s, hypoxic and AMS, intubated for airway protection. He received a fluid bolus 500ml x 1 with mild response and was put on low dose Levophed
- WBC was 10, Hematocrit 30 and Creatinine was 2.2 (baseline normal)
- He was treated with Vancomycin, Zosyn and Zithromax
- His respiratory pathogen panel was negative
- The team placed him in respiratory isolation to rule out COVID-19

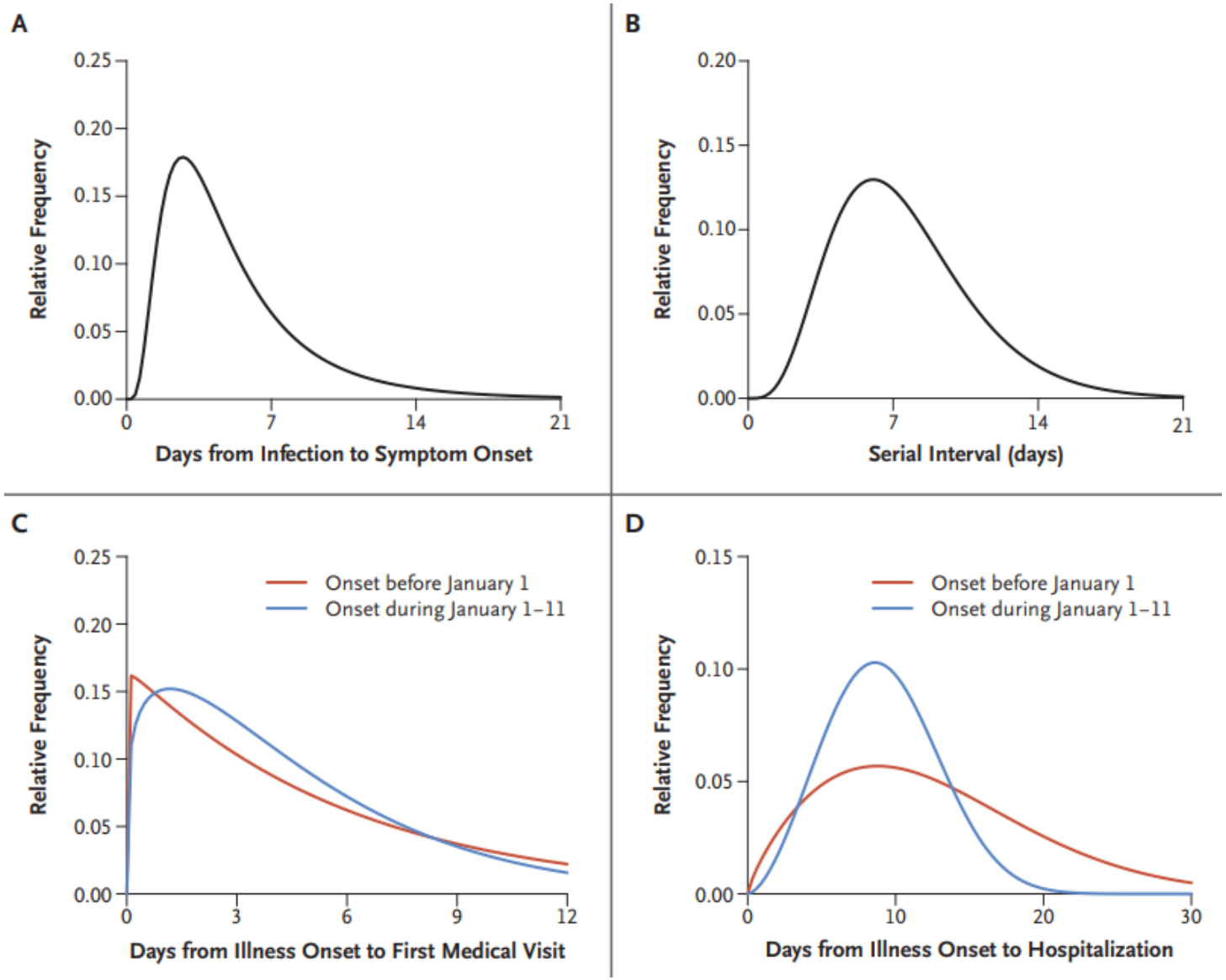
February 14, 2020



March 16, 2020



Time Interval of Infection to Symptom Onset With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China



Q Li et al. *N Engl J Med* 2020. DOI: 10.1056/NEJMoa2001316

Clinical Characteristics of 138 Hospitalized Patients With 2019 Novel Coronavirus–Infected Pneumonia in Wuhan, China

- Retrospective, single-center case series of the 138, consecutive hospitalized patients with confirmed NCIP at Zhongnan Hospital of Wuhan University in Wuhan, China, from January 1 to January 28, 2020
- Epidemiological, demographic, clinical, laboratory, radiological, and treatment data were collected and analyzed
- Clinical Features:
  - The median age was 56 years (IQR, 42-68; range, 22-92 years), and 75 (54.3%) were men
  - 102 (73.9%) were admitted to isolation wards, and 36 (26.1%) were admitted and transferred to the ICU because of the development of organ dysfunction
  - The time from onset to dyspnea was 5.0 days, 7.0 days to hospital admission, and 8.0 days to ARDS
  - Common symptoms at onset of illness were fever, dry cough, myalgia, fatigue, dyspnea, and anorexia
  - Hypertension (43 [31.2%]), diabetes (14 [10.1%]), cardiovascular disease (20 [14.5%]), and malignancy (10 [7.2%]) were the most common coexisting conditions
  - Of the 138 patients included in this study, 26% required ICU care, 34.1% were discharged, 6 died (4.3%), and 61.6% remain hospitalized
  - For those who were discharged (n = 47), the hospital stay was 10 days (IQR, 7.0-14.0)

Wang et al. *JAMA* 2020

Table 1. Baseline Characteristics of Patients Infected With 2019-nCoV

	No. (%)			
	Total (N = 138)	ICU (n = 36)	Non-ICU (n = 102)	*P* Value[a]
Age, median (IQR), y	56 (42-68)	66 (57-78)	51 (37-62)	<.001
Sex				
Female	63 (45.7)	14 (38.9)	49 (48.0)	.34
Male	75 (54.3)	22 (61.1)	53 (52.0)	
Huanan Seafood Wholesale Market exposure	12 (8.7)	5 (13.9)	7 (6.9)	.30
Infected				
Hospitalized patients	17 (12.3)	9 (25.0)	8 (7.8)	.02
Medical staff	40 (29)	1 (2.8)	39 (38.2)	<.001
Comorbidities	64 (46.4)	26 (72.2)	38 (37.3)	<.001
Hypertension	43 (31.2)	21 (58.3)	22 (21.6)	<.001
Cardiovascular disease	20 (14.5)	9 (25.0)	11 (10.8)	.04
Diabetes	14 (10.1)	8 (22.2)	6 (5.9)	.009
Malignancy	10 (7.2)	4 (11.1)	6 (5.9)	.29
Cerebrovascular disease	7 (5.1)	6 (16.7)	1 (1.0)	.001
COPD	4 (2.9)	3 (8.3)	1 (1.0)	.054
Chronic kidney disease	4 (2.9)	2 (5.6)	2 (2.0)	.28
Chronic liver disease	4 (2.9)	0	4 (3.9)	.57
HIV infection	2 (1.4)	0	2 (2.0)	>.99
Signs and symptoms				
Fever	136 (98.6)	36 (100)	100 (98.0)	>.99
Fatigue	96 (69.6)	29 (80.6)	67 (65.7)	.10
Dry cough	82 (59.4)	21 (58.3)	61 (59.8)	.88
Anorexia	55 (39.9)	24 (66.7)	31 (30.4)	<.001
Myalgia	48 (34.8)	12 (33.3)	36 (35.3)	.83
Dyspnea	43 (31.2)	23 (63.9)	20 (19.6)	<.001
Expectoration	37 (26.8)	8 (22.2)	29 (28.4)	.35
Pharyngalgia	24 (17.4)	12 (33.3)	12 (11.8)	.003
Diarrhea	14 (10.1)	6 (16.7)	8 (7.8)	.20
Nausea	14 (10.1)	4 (11.1)	10 (9.8)	>.99
Dizziness	13 (9.4)	8 (22.2)	5 (4.9)	.007
Headache	9 (6.5)	3 (8.3)	6 (5.9)	.70
Vomiting	5 (3.6)	3 (8.3)	2 (2.0)	.13
Abdominal pain	3 (2.2)	3 (8.3)	0 (0)	.02
Onset of symptom to, median (IQR), d				
Hospital admission	7.0 (4.0-8.0)	8.0 (4.5-10.0)	6.0 (3.0-7.0)	.009
Dyspnea	5.0 (1.0-10.0)	6.5 (3.0-10.8)	2.5 (0.0-7.3)	.02
ARDS	8.0 (6.0-12.0)	8.0 (6.0-12.0)	8.0 (6.3-11.3)	.97
Heart rate, median (IQR), bpm	88 (78-97)	89 (81-101)	86 (77-96)	.14
Respiratory rate, median (IQR)	20 (19-21)	20 (16-25)	20 (19-21)	.57

Risk Factor Take Home Points

- Age
- Vascular disease
- Hypertension
- Diabetes

Symptoms Take Home Points

- Dyspnea
- Body Aches
- Dizziness
- Abdominal pain
- Anorexia

Wang et al. *JAMA* 2020

Table 2. Laboratory Findings of Patients Infected With 2019-nCoV on Admission to Hospital

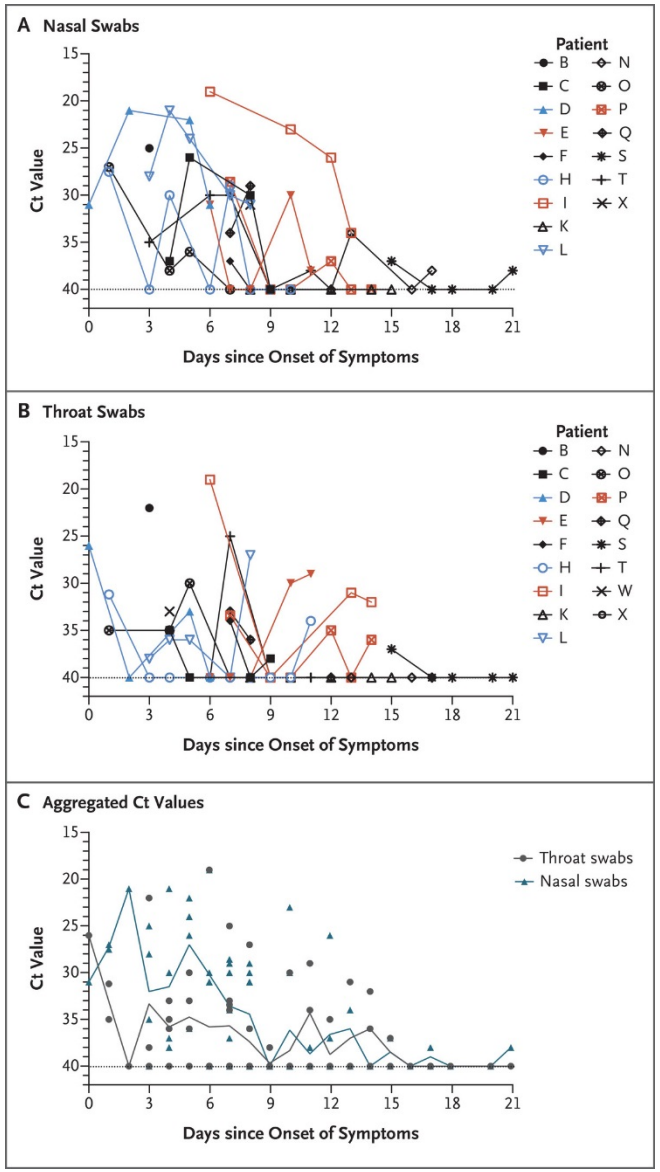
	Normal Range	Median (IQR)			P Value[a]
		Total (N = 138)	ICU (n = 36)	Non-ICU (n = 102)	
White blood cell count, $\times 10^9$/L	3.5-9.5	4.5 (3.3-6.2)	6.6 (3.6-9.8)	4.3 (3.3-5.4)	.003
Neutrophil count, $\times 10^9$/L	1.8-6.3	3.0 (2.0-4.9)	4.6 (2.6-7.9)	2.7 (1.9-3.9)	<.001
Lymphocyte count, $\times 10^9$/L	1.1-3.2	0.8 (0.6-1.1)	0.8 (0.5-0.9)	0.9 (0.6-1.2)	.03
Monocyte count, $\times 10^9$/L	0.1-0.6	0.4 (0.3-0.5)	0.4 (0.3-0.5)	0.4 (0.3-0.5)	.96
Platelet count, $\times 10^9$/L	125-350	163 (123-191)	142 (119-202)	165 (125-188)	.78
Prothrombin time, s	9.4-12.5	13.0 (12.3-13.7)	13.2 (12.3-14.5)	12.9 (12.3-13.4)	.37
Activated partial thromboplastin time, s	25.1-36.5	31.4 (29.4-33.5)	30.4 (28.0-33.5)	31.7 (29.6-33.5)	.09
D-dimer, mg/L	0-500	203 (121-403)	414 (191-1324)	166 (101-285)	<.001
Creatine kinase, U/L	<171	92 (56-130)	102 (62-252)	87 (54-121)	.08
Creatine kinase-MB, U/L	<25	14 (10-18)	18 (12-35)	13 (10-14)	<.001
Lactate dehydrogenase, U/L	125-243	261 (182-403)	435 (302-596)	212 (171-291)	<.001
Alanine aminotransferase, U/L	9-50	24 (16-40)	35 (19-57)	23 (15-36)	.007
Aspartate aminotransferase, U/L	15-40	31 (24-51)	52 (30-70)	29 (21-38)	<.001
Total bilirubin, mmol/L	5-21	9.8 (8.4-14.1)	11.5 (9.6-18.6)	9.3 (8.2-12.8)	.02
Blood urea nitrogen, mmol/L	2.8-7.6	4.4 (3.4-5.8)	5.9 (4.3-9.6)	4.0 (3.1-5.1)	<.001
Creatinine, μmol/L	64-104	72 (60-87)	80 (66-106)	71 (58-84)	.04
Hypersensitive troponin I, pg/mL	<26.2	6.4 (2.8-18.5)	11.0 (5.6-26.4)	5.1 (2.1-9.8)	.004
Procalcitonin, ng/mL					
≥0.05, No. (%)	<0.05	49 (35.5)	27 (75.0)	22 (21.6)	<.001
Bilateral distribution of patchy shadows or ground glass opacity, No. (%)	NA	138 (100)	36 (100)	102 (100)	>.99

Laboratory Take Home Points

- WBC
- Lymphopenia
- D-Dimer
- CK, CK-MB and troponin
- LDH
- AST/ALT/Bilirubin
- Procalcitonin

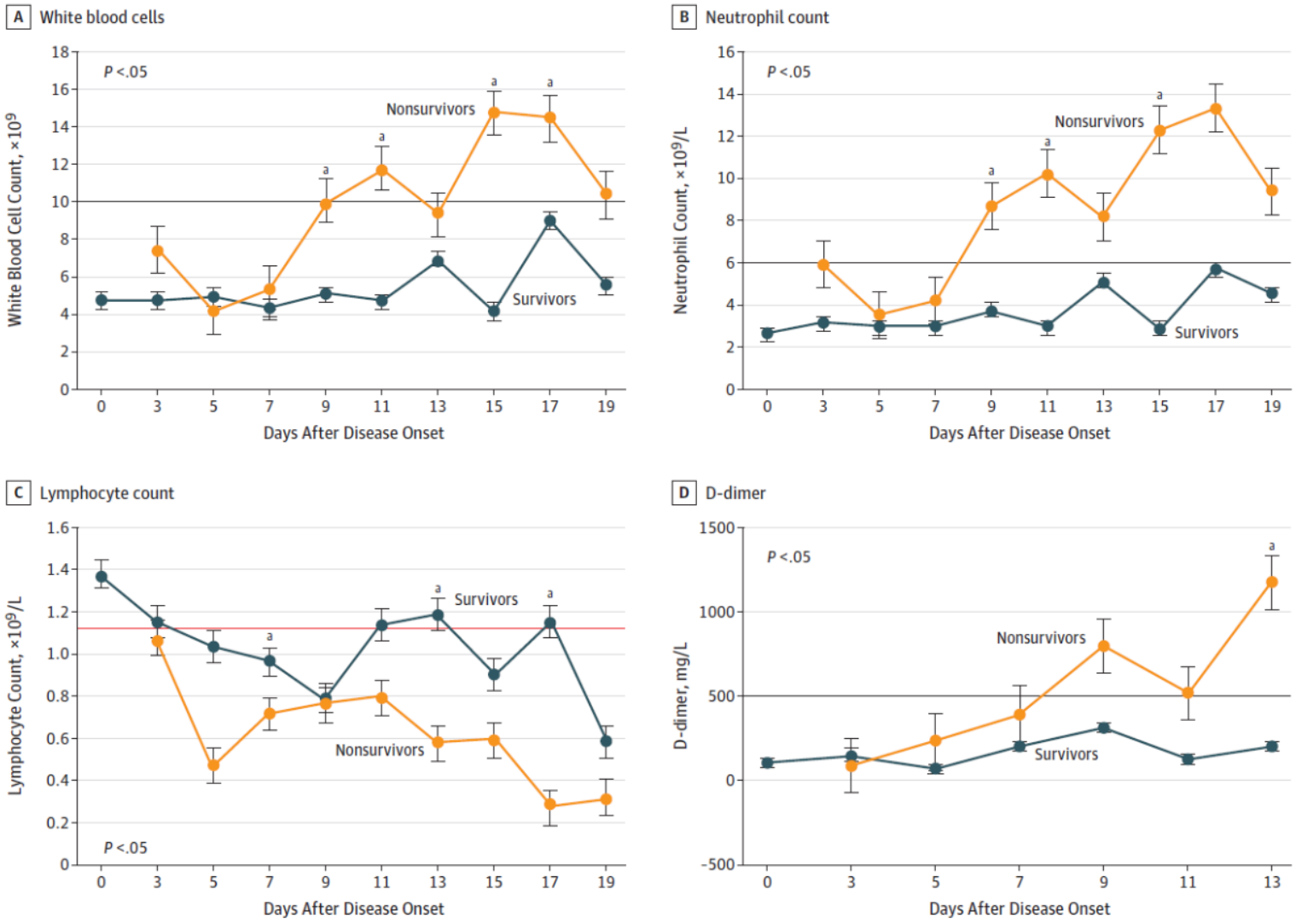
Wang et al. *JAMA* 2020

Viral Load Detected in Nasal and Throat Swabs Obtained from Patients Infected with SARS-CoV-2.



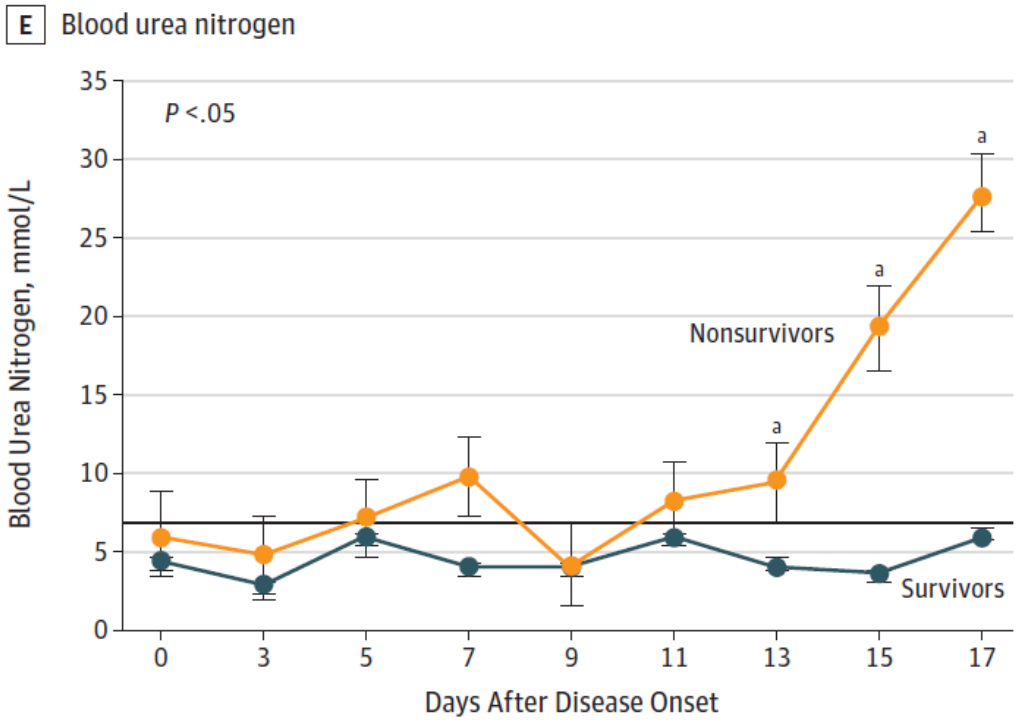
L Zou et al. N Engl J Med 2020. DOI: 10.1056/NEJMc2001737

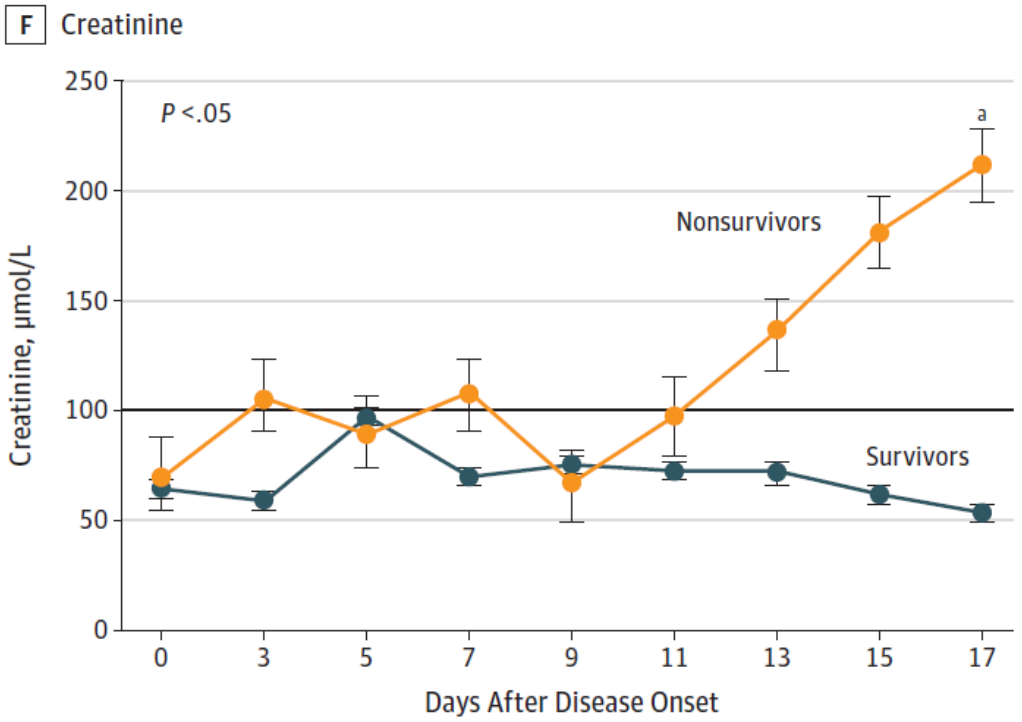
Labs and Prognosis



Wang et al. *JAMA* 2020

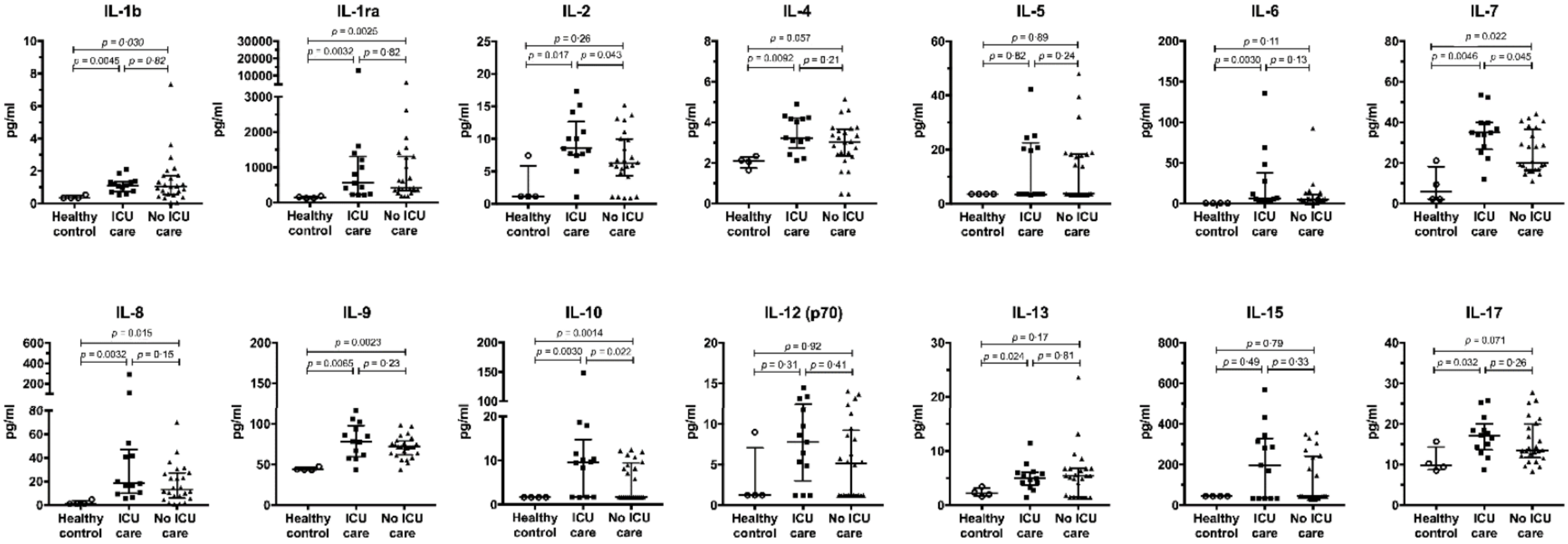
Renal Function and Prognosis





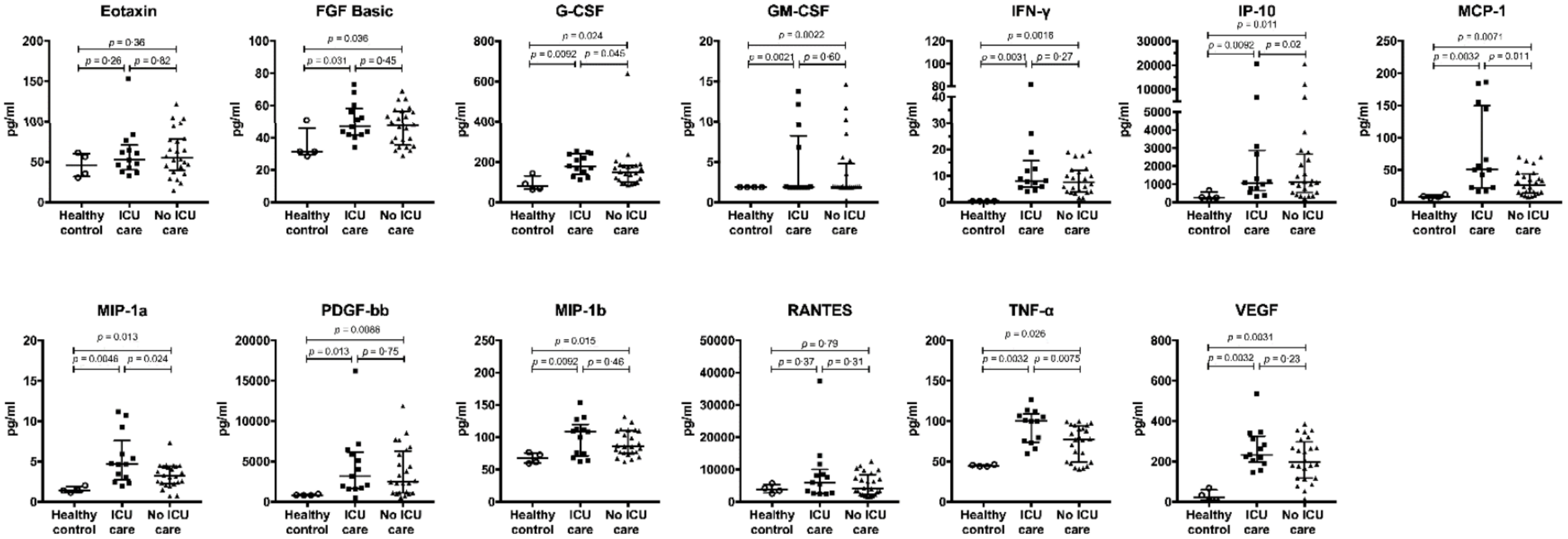
Wang et al. *JAMA* 2020

Plasma Cytokine Levels in COVID 19



Huang et al. *Lancet* 2020

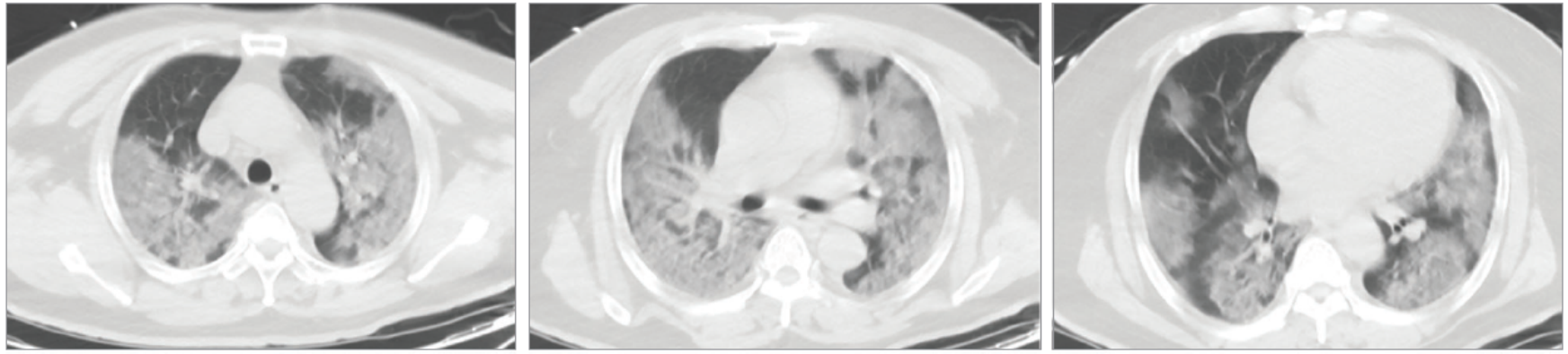
Plasma Chemokine Levels in COVID 19



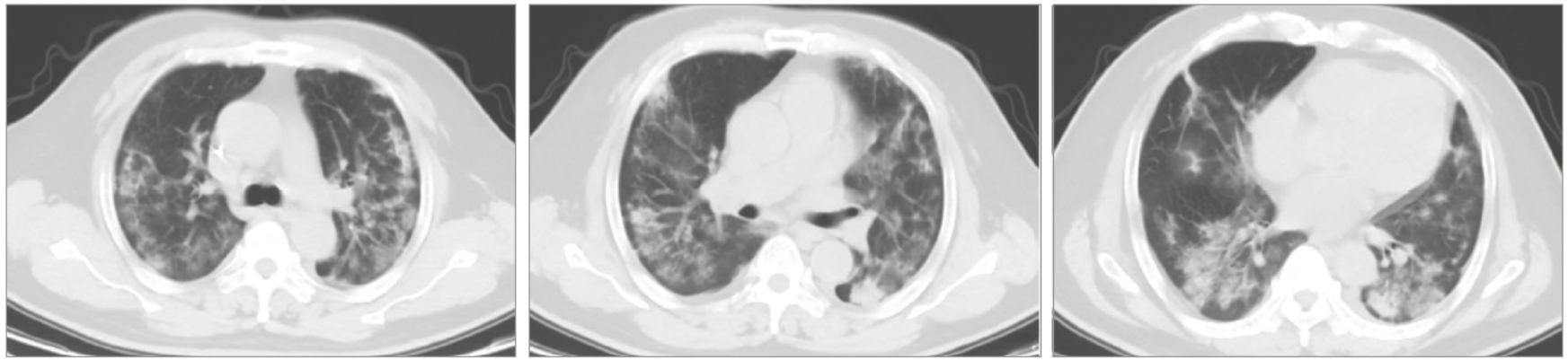
Huang et al. *Lancet* 2020

Radiographic Features

A Computed tomography images on day 5 after symptom onset



B Computed tomography images after treatment on day 19 after symptom onset



A, Chest computed tomographic images obtained on January 7, 2020, show ground glass opacity in both lungs on day 5 after symptom onset. B, Images taken on January 21, 2020, show the absorption of bilateral ground glass opacity after the treatment of extracorporeal membrane oxygenation from January 7 to 12 in the intensive care unit.

Wang et al. *JAMA* 2020

RECOVERY TRIAL

- A randomized trial of Decadron 6 mg daily for 10 days for COVID19 patients
- Primary outcome was all cause mortality at 28 days
- Secondary outcomes: Length of stay, need and duration of mechanical ventilation, dialysis
- Patients were randomized to usual care or Decadron 6 mg daily for up to 10 days

Characteristics of the Patients at Baseline, According to Treatment Assignment and Level of Respiratory Support.*

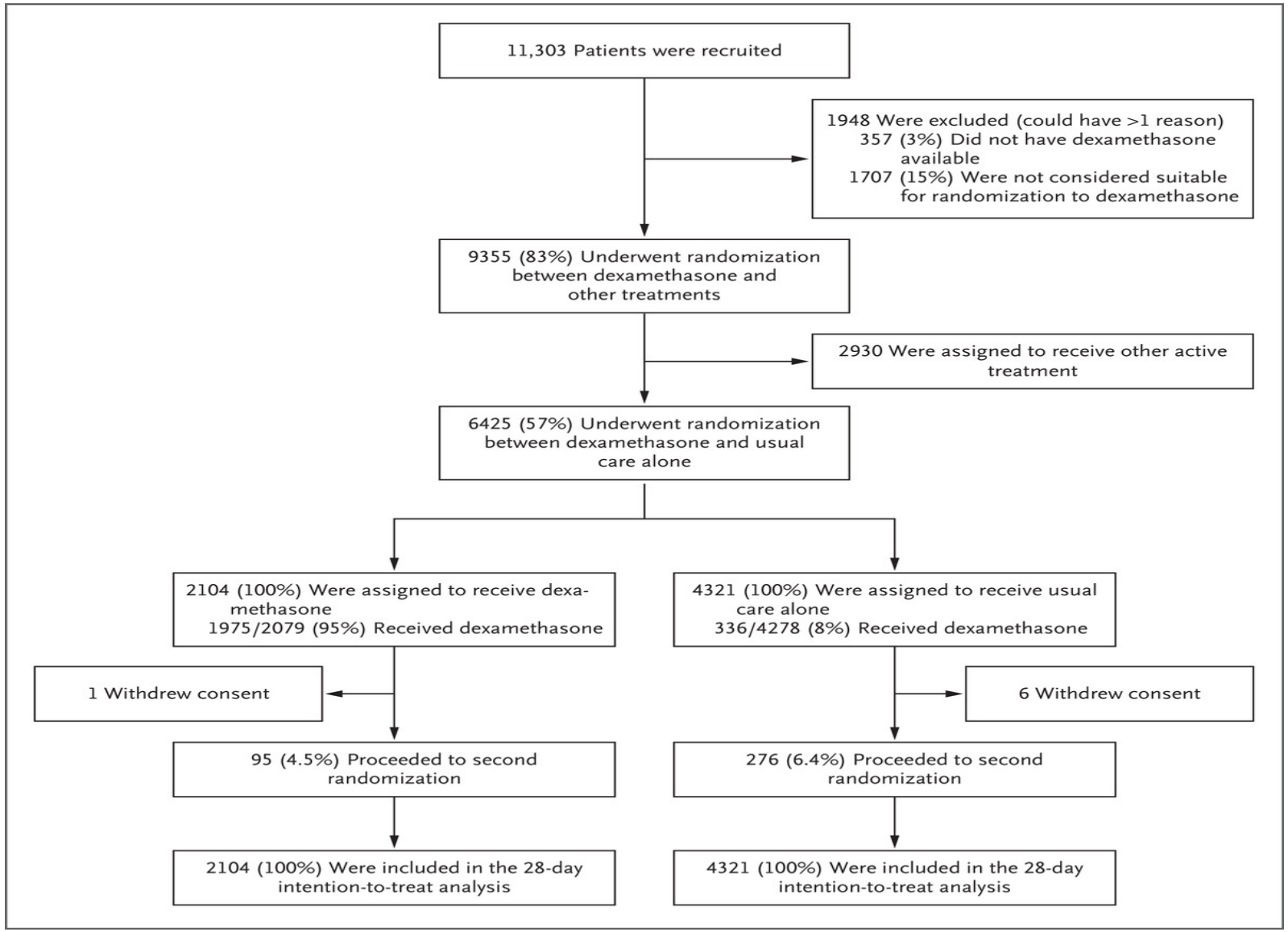
Table 1. Characteristics of the Patients at Baseline, According to Treatment Assignment and Level of Respiratory Support.*

Characteristic	Treatment Assignment		Respiratory Support Received at Randomization		
	Dexamethasone (N=2104)	Usual Care (N=4321)	No Receipt of Oxygen (N=1535)	Oxygen Only (N=3883)	Invasive Mechanical Ventilation (N=1007)
Age†					
Mean — yr	66.9±15.4	65.8±15.8	69.4±17.5	66.7±15.3	59.1±11.4
Distribution — no. (%)					
<70 yr	1141 (54)	2504 (58)	659 (43)	2148 (55)	838 (83)
70 to 79 yr	469 (22)	859 (20)	338 (22)	837 (22)	153 (15)
≥80 yr	494 (23)	958 (22)	538 (35)	898 (23)	16 (2)
Sex — no. (%)					
Male	1338 (64)	2749 (64)	891 (58)	2462 (63)	734 (73)
Female‡	766 (36)	1572 (36)	644 (42)	1421 (37)	273 (27)
Median no. of days since symptom onset (IQR)§	8 (5–13)	9 (5–13)	6 (3–10)	9 (5–12)	13 (8–18)
Median no. of days since hospitalization (IQR)	2 (1–5)	2 (1–5)	2 (1–6)	2 (1–4)	5 (3–9)
Respiratory support received — no. (%)					
No oxygen	501 (24)	1034 (24)	1535 (100)	NA	NA
Oxygen only	1279 (61)	2604 (60)	NA	3883 (100)	NA
Invasive mechanical ventilation	324 (15)	683 (16)	NA	NA	1007 (100)
Previous coexisting disease					
Any	1174 (56)	2417 (56)	911 (59)	2175 (56)	505 (50)
Diabetes	521 (25)	1025 (24)	342 (22)	950 (24)	254 (25)
Heart disease	586 (28)	1171 (27)	519 (34)	1074 (28)	164 (16)
Chronic lung disease	415 (20)	931 (22)	351 (23)	883 (23)	112 (11)
Tuberculosis	6 (<1)	19 (<1)	8 (1)	11 (<1)	6 (1)
HIV infection	12 (1)	20 (<1)	5 (<1)	21 (1)	6 (1)
Severe liver disease¶	37 (2)	82 (2)	32 (2)	72 (2)	15 (1)
Severe kidney impairment‖	166 (8)	358 (8)	119 (8)	253 (7)	152 (15)
SARS-CoV-2 test result					
Positive	1850 (88)	3848 (89)	1333 (87)	3416 (88)	949 (94)
Negative	247 (12)	453 (10)	193 (13)	452 (12)	55 (5)
Test result not yet known	7 (<1)	20 (<1)	9 (1)	15 (<1)	3 (<1)

* Plus–minus values are means ±SD. HIV denotes human immunodeficiency virus, IQR interquartile range, NA not applicable, and SARS-CoV-2 severe acute respiratory syndrome coronavirus 2.
† There was a significant (P=0.01) difference in the mean age between patients in the dexamethasone group and those in the usual care group, but there were no significant differences between the groups in any other baseline characteristic.
‡ Included in this category were 6 pregnant women.
§ Data regarding the number of days since symptom onset were missing for 4 patients in the dexamethasone group and 13 patients in the usual care group; these patients were excluded from estimates of the median number of days since onset.
¶ Severe liver disease was defined as requiring ongoing specialist care.
‖ Severe kidney impairment was defined as an estimated glomerular filtration rate of less than 30 ml per minute per 1.73 m^2.

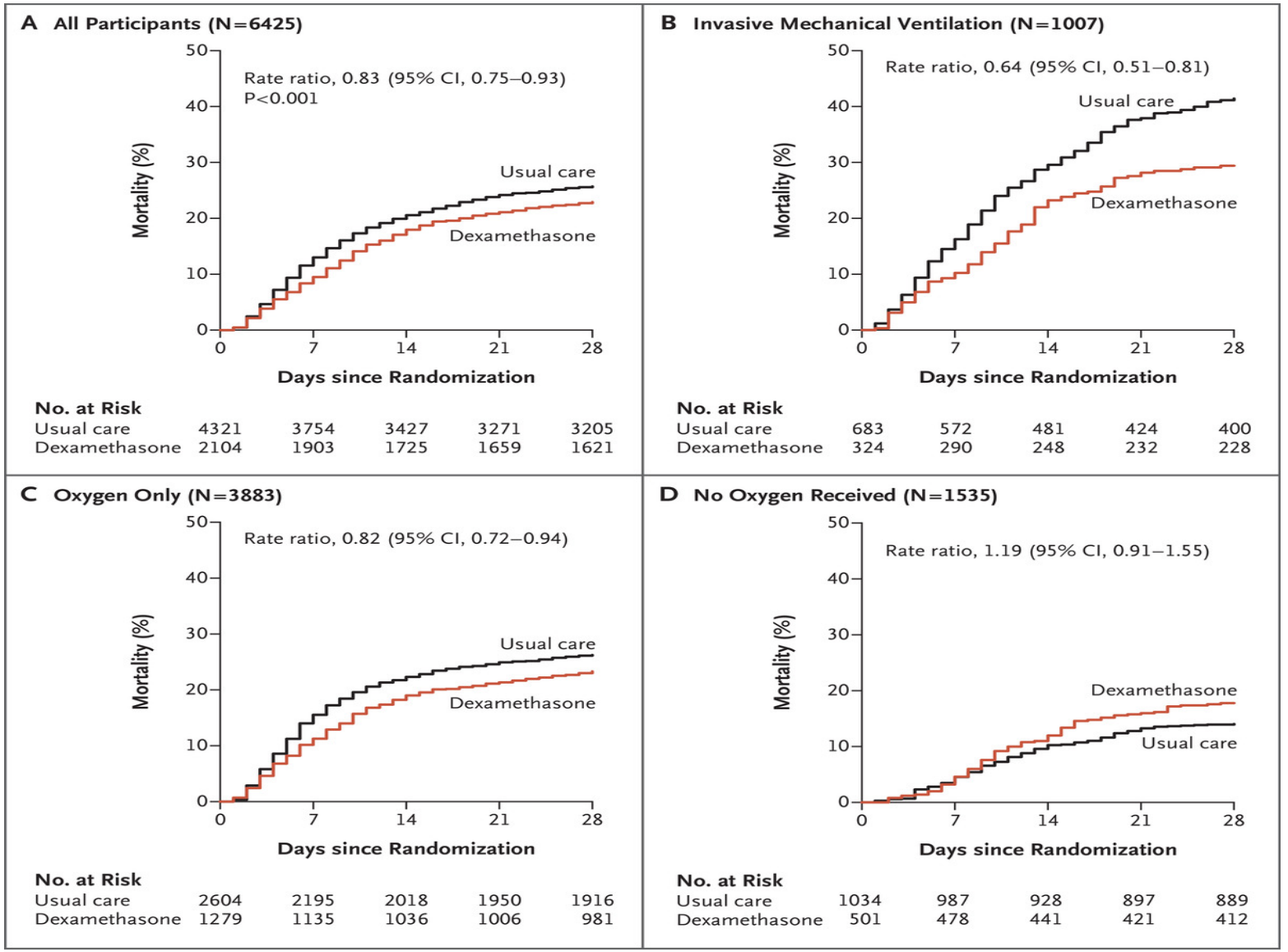
The RECOVERY Collaborative Group. N Engl J Med 2020. DOI: 10.1056/NEJMoa2021436

Enrollment, Randomization, and Inclusion in the Primary Analysis.



The RECOVERY Collaborative Group. N Engl J Med 2020. DOI: 10.1056/NEJMoa2021436

Mortality at 28 Days in All Patients and According to Respiratory Support at Randomization.



The RECOVERY Collaborative Group. N Engl J Med 2020. DOI: 10.1056/NEJMoa2021436

Effect of Dexamethasone on 28-Day Mortality, According to Respiratory Support at Randomization.

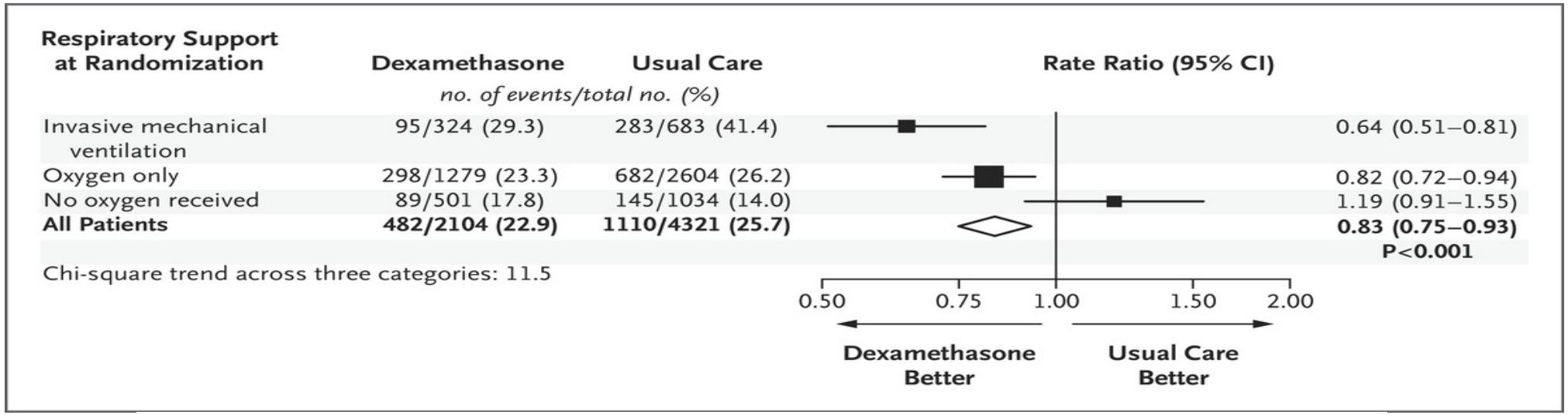


Table 2. Primary and Secondary Outcomes.

Outcome	Dexamethasone (N=2104)	Usual Care (N=4321)	Rate or Risk Ratio (95% CI)*
	no./total no. of patients (%)		
Primary outcome			
Mortality at 28 days	482/2104 (22.9)	1110/4321 (25.7)	0.83 (0.75–0.93)
Secondary outcomes			
Discharged from hospital within 28 days	1413/2104 (67.2)	2745/4321 (63.5)	1.10 (1.03–1.17)
Invasive mechanical ventilation or death†	456/1780 (25.6)	994/3638 (27.3)	0.92 (0.84–1.01)
Invasive mechanical ventilation	102/1780 (5.7)	285/3638 (7.8)	0.77 (0.62–0.95)
Death	387/1780 (21.7)	827/3638 (22.7)	0.93 (0.84–1.03)

* Rate ratios have been adjusted for age with respect to the outcomes of 28-day mortality and hospital discharge. Risk ratios have been adjusted for age with respect to the outcome of receipt of invasive mechanical ventilation or death and its subcomponents.
† Excluded from this category are patients who were receiving invasive mechanical ventilation at randomization.

The RECOVERY Collaborative Group. N Engl J Med 2020. DOI: 10.1056/NEJMoa2021436

Summary of Findings

- Decadron had a mortality benefit especially for those with advanced respiratory disease
- This treatment may address the damaging immune responses during week 2 of infection
- This trial was not blinded
- What were the absolute contraindications to Decadron?
- We need to know those to see how this study applies to our patients

ACTT-1 Remdesivir Trial

- 60 trial sites and 13 subsites in the United States and other countries
- February 21, 2020, and ended on April 19, 2020
- Remdesivir was administered intravenously as a 200-mg loading dose on day 1, followed by a 100-mg maintenance dose administered daily on days 2 through 10 or until hospital discharge or death
- The primary outcome measure was the time to recovery
- Other outcomes included mortality at 14 and 28 days after enrollment and grade 3 and 4 adverse events and serious adverse events

Demographic and Clinical Characteristics at Baseline.*

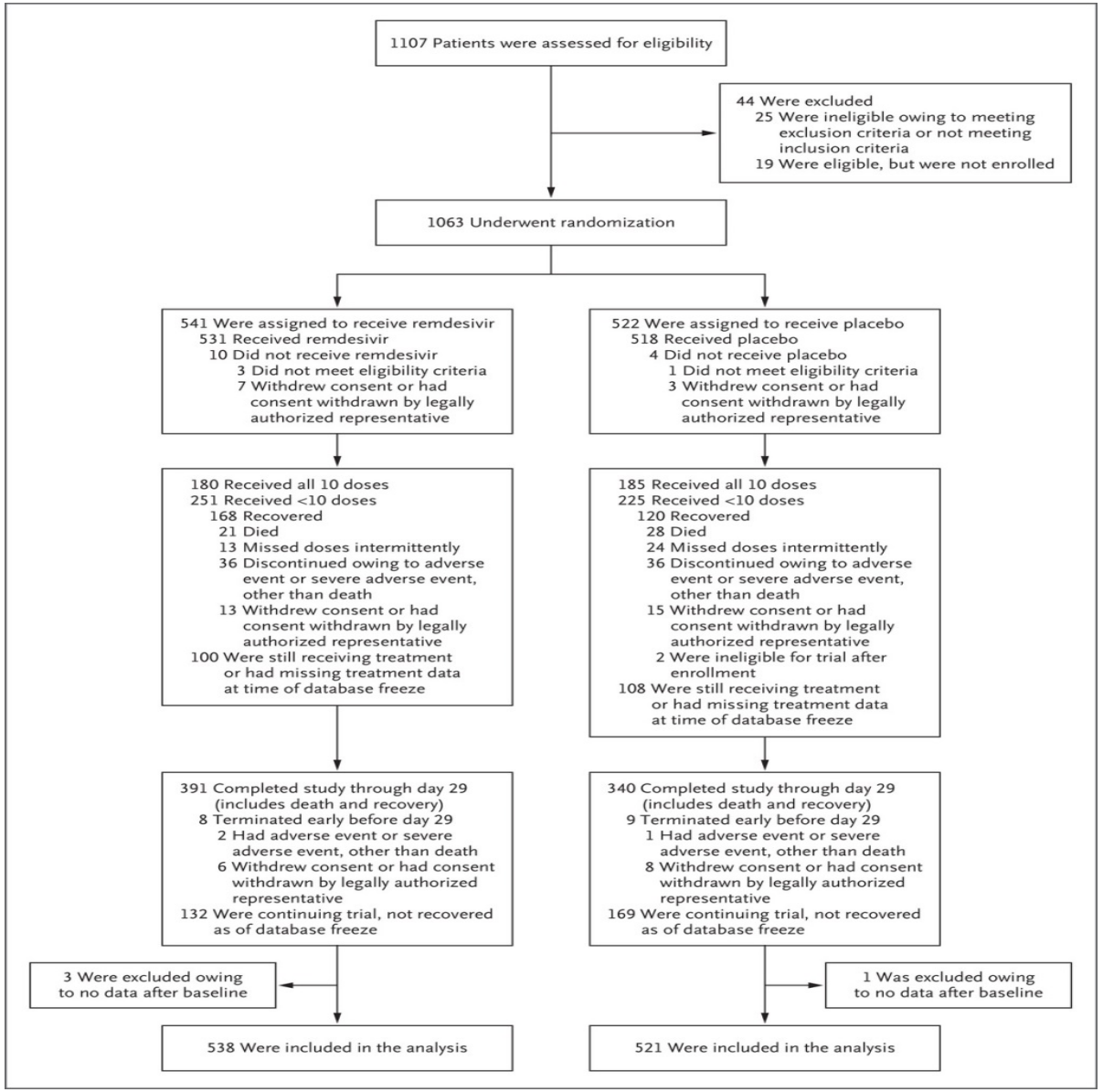
Table 1. Demographic and Clinical Characteristics at Baseline.*

Characteristic	All (N = 1063)	Remdesivir (N = 541)	Placebo (N = 522)
Age — yr	58.9±15.0	58.6±14.6	59.2±15.4
Male sex — no. (%)	684 (64.3)	352 (65.1)	332 (63.6)
Race or ethnic group — no. (%)†			
American Indian or Alaska Native	7 (0.7)	4 (0.7)	3 (0.6)
Asian	134 (12.6)	77 (14.2)	57 (10.9)
Black or African American	219 (20.6)	108 (20.0)	111 (21.3)
White	565 (53.2)	279 (51.6)	286 (54.8)
Hispanic or Latino — no. (%)	249 (23.4)	132 (24.4)	117 (22.4)
Median time (IQR) from symptom onset to randomization — days‡	9 (6–12)	9 (6–12)	9 (7–13)
No. of coexisting conditions — no. /total no. (%)‡			
None	193/920 (21.0)	91/467 (19.5)	102/453 (22.5)
One	248/920 (27.0)	131/467 (28.1)	117/453 (25.8)
Two or more	479/920 (52.1)	245/467 (52.5)	234/453 (51.7)
Coexisting conditions — no./total no. (%)			
Hypertension	460/928 (49.6)	231/469 (49.3)	229/459 (49.9)
Obesity	342/925 (37.0)	177/469 (37.7)	165/456 (36.2)
Type 2 diabetes	275/927 (29.7)	144/470 (30.6)	131/457 (28.7)
Score on ordinal scale — no. (%)			
4. Hospitalized, not requiring supplemental oxygen, requiring ongoing medical care (Covid-19–related or otherwise)	127 (11.9)	67 (12.4)	60 (11.5)
5. Hospitalized, requiring supplemental oxygen	421 (39.6)	222 (41.0)	199 (38.1)
6. Hospitalized, receiving noninvasive ventilation or high-flow oxygen devices	197 (18.5)	98 (18.1)	99 (19.0)
7. Hospitalized, receiving invasive mechanical ventilation or ECMO	272 (25.6)	125 (23.1)	147 (28.2)
Baseline score missing	46 (4.3)	29 (5.4)	17 (3.3)

* Plus–minus values are means ±SD. Percentages may not total 100 because of rounding. IQR denotes interquartile range. The full table of baseline characteristics is available in the Supplementary Appendix.
† Race and ethnic group were reported by the patients. The number of patients in other races and ethnic groups are listed in Table S1 in the Supplementary Appendix.
‡ As of April 28, 2020, data on symptom onset were missing for 15 patients; data on coexisting conditions were missing for 133 patients and were incomplete for 10 patients.

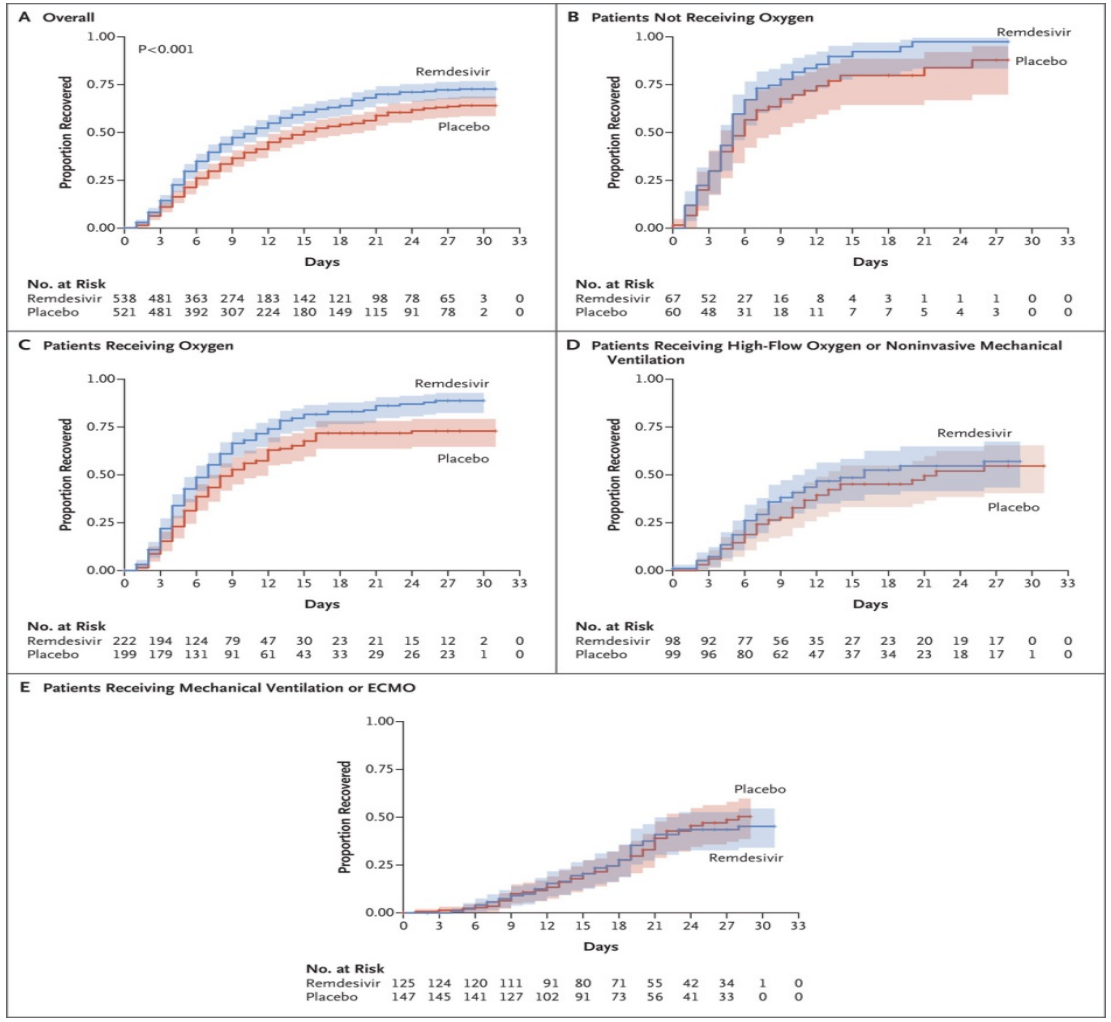
JH Beigel et al. N Engl J Med 2020. DOI: 10.1056/NEJMoa2007764

Enrollment and Randomization.



JH Beigel et al. N Engl J Med 2020. DOI: 10.1056/NEJMoa2007764

Kaplan–Meier Estimates of Cumulative Recoveries.



JH Beigel et al. N Engl J Med 2020. DOI: 10.1056/NEJMoa2007764

Summary of Findings

- Remdesivir significantly shortened recovery time (15 days to 11 days; $p<0.001$)
- There was a trend improvement in survival (7.1% with Remdesivir vs. 11.9% with placebo)
- Serious adverse effects were similar in both groups
- These findings contrast with a Chinese study that showed no clinical benefit
- The primary outcome of the Gilead trial was changed mid stream from disease severity scores to time of recovery

TESEO Tociluzimab and Severe COVID19 Pneumonia

- Retrospective, observational cohort study done in three tertiary care centres in the Emilia-Romagna region, Italy, on patients with severe COVID-19 pneumonia
- The study population was adults (≥18 years) with COVID-19, confirmed by PCR on nasopharyngeal swab
- Eligible patients had severe pneumonia, defined as at least one of the following: presence of a respiratory rate of 30 or more breaths per minute, peripheral blood oxygen saturation (SaO2) of less than 93% in room air, a ratio of arterial oxygen partial pressure (PaO2) to fractional inspired oxygen (FiO2) of less than 300 mm Hg in room air
- Exclusion criteria for the use of tocilizumab were coexistent infection and active diverticulitis, inflammatory bowel disease, or another symptomatic gastrointestinal tract condition that might predispose patients to bowel perforation
- Intravenous tocilizumab was administered at 8 mg/kg bodyweight (up to a maximum of 800 mg) administered twice, 12 h apart
- The primary outcome of the study was a composite of death or invasive mechanical ventilation.

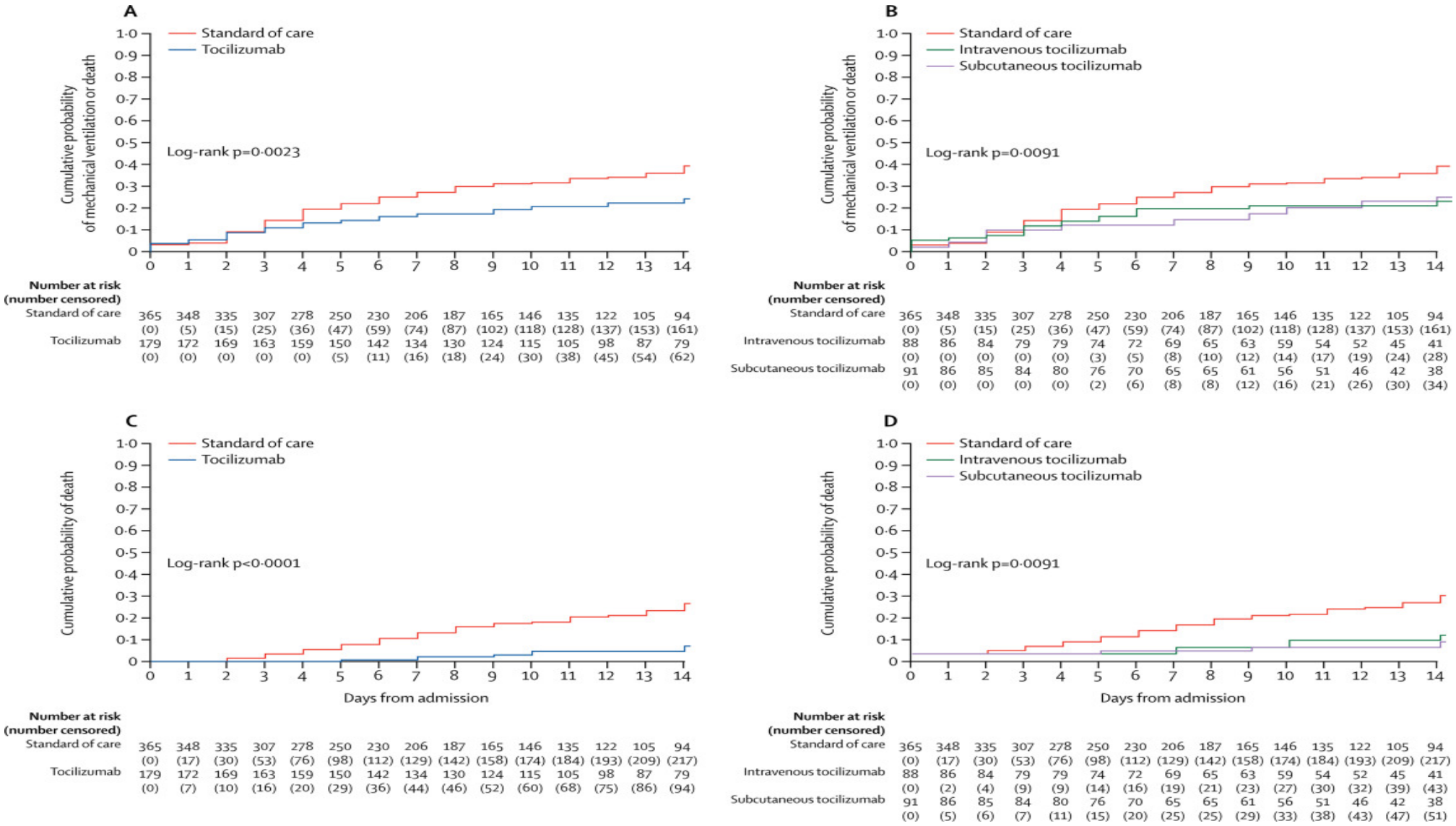
Table 1 Characteristics of patients from all centres combined

			Tocilizumab plus standard care group (n=179)			Standard care group (n=365)	p value	All patients (n=544)
			Subcutaneous (n=91)	Intravenous (n=88)	Overall (n=179)			
Baseline characteristics								
Age (years)			67 (55–73)	63 (54–72)	64 (54–72)	69 (57–78)	0·0064	67 (56–77)
Sex			..	..	..	..	0·088	..
	Female		28 (31%)	24 (27%)	52 (29%)	133 (36%)	..	185 (34%)
	Male		63 (69%)	64 (73%)	127 (71%)	232 (64%)	..	359 (66%)
Baseline PaO_2/FiO_2 (mm Hg)			199 (123–262)	145 (102–229)	169 (106–246)	277 (191–345)	<0·0001	239 (139–306)
Baseline SOFA score			2 (1–3)	3 (2–4)	3 (2–4)	2 (0–3)	0·0004	2 (1–4)
Duration of symptoms (days from symptom onset)			8 (5–10)	4 (3–8)	7 (4–10)	5 (2–9)	0·0017	6 (3–9)
Outcomes								
Follow-up (days)			12 (6–17)	13 (7–18)	12 (6–17)	8 (4–14)	<0·0001	9 (4–15)
Events								
	Mechanical ventilation		17 (19%)	16 (18%)	33 (18%)	57 (16%)	0·41	90 (17%)
		Deaths after mechanical ventilation*	2 (12%)	3 (19%)	5 (15%)	14 (25%)	0·51	19 (21%)
	Death		7 (8%)	6 (7%)	13 (7%)	73 (20%)	0·0007	86 (16%)

Data are median (IQR) or n (%) unless otherwise indicated. The p values refer to differences between overall tocilizumab and standard of care and were calculated using the χ^2 test or Kruskal-Wallis test as appropriate. PaO_2/FiO_2=ratio of arterial oxygen partial pressure to fractional inspired oxygen. SOFA=Subsequent Organ Failure Assessment.

* Percentages show the proportion of those who were mechanically ventilated.

Study Outcomes



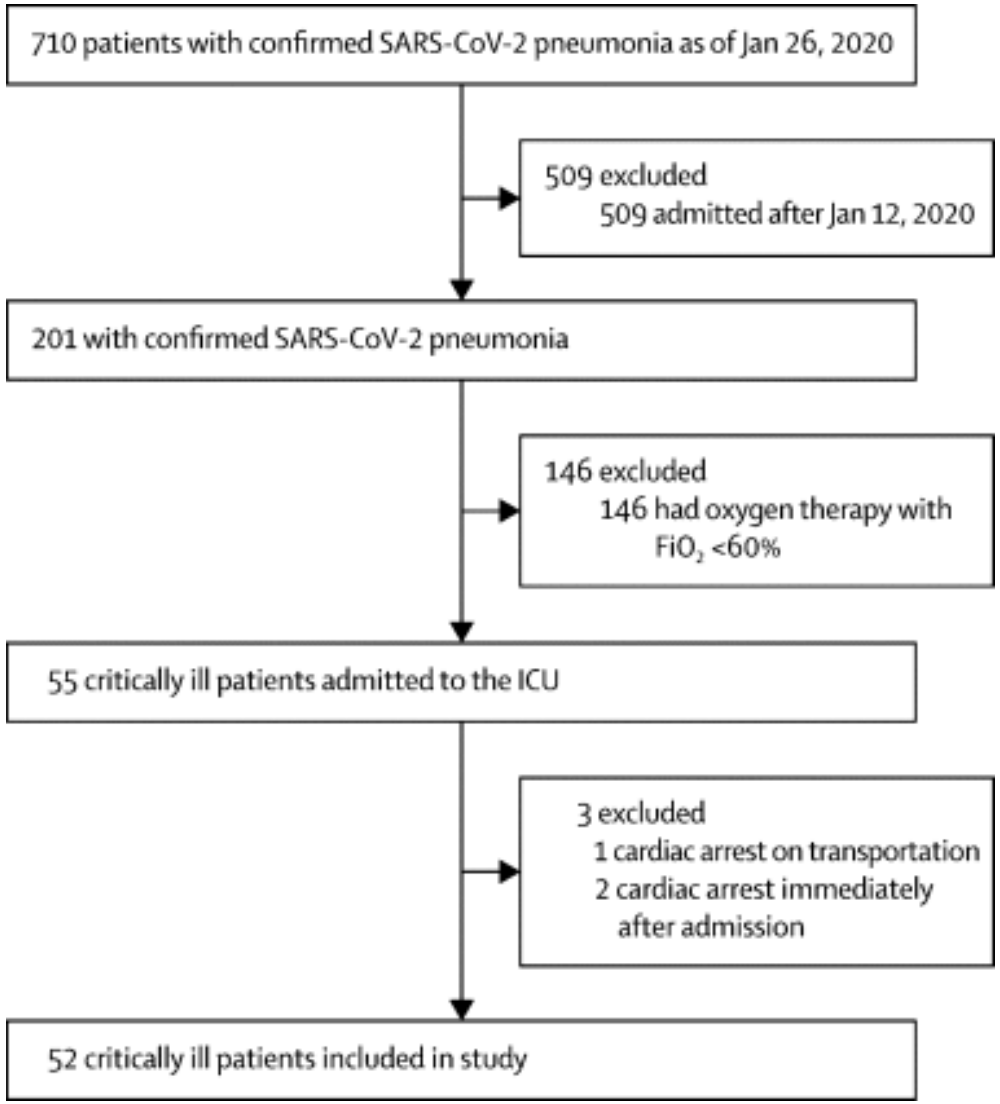
The Lancet Rheumatology DOI: (10.1016/S2665-9913(20)30173-9)

Summary of Findings

- Tociluzimab decreased the risk of death or mechanical ventilation
- However, Tociluzimab increased the risk of infection
- This is not a randomized trial so confounding is a real concern
- The study was not blinded and this could modify clinician behavior

ICU Experience with COVID 19

Single-centered, retrospective, observational study, we enrolled 52 critically ill adult patients with SARS-CoV-2 pneumonia who were admitted to the intensive care unit (ICU) of Wuhan Jin Yin-tan hospital



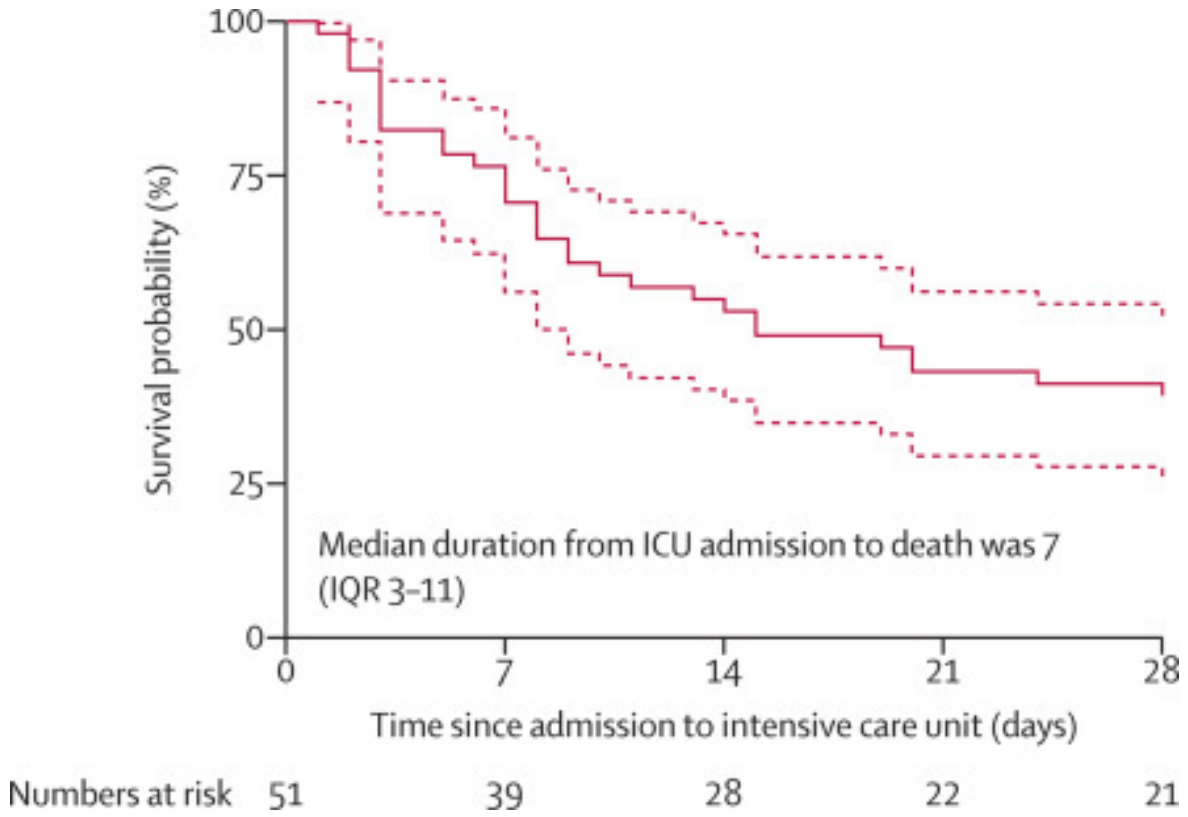
Yang et al. *Lancet Respiratory Med* 2020

Factors Associated with Survival

	Survivors (n=20)	Non-survivors (n=32)	All patients (n=52)
Age, years	51·9 (12·9)	64·6 (11·2)	59·7 (13·3)
Age range, years			
30–39	6 (30%)	0	6 (11·5%)
40–49	3 (15%)	3 (9%)	6 (11·5%)
50–59	4 (20%)	9 (28%)	13 (25%)
60–69	6 (30%)	11 (34%)	17 (33%)
70–79	1 (5%)	7 (22%)	8 (15%)
≥80	0	2 (6%)	2 (4%)
Sex			
Female	6 (30%)	11 (34%)	17 (33%)
Male	14 (70%)	21 (66%)	35 (67%)
Exposure			
Exposure to Huanan seafood market	9 (45%)	8 (25%)	17 (33%)
Exposure to patients*	2 (10%)	8 (25%)	10 (19%)
Chronic medical illness	5 (25%)	16 (50%)	21 (40%)
Chronic cardiac disease	2 (10%)	3 (9%)	5 (10%)
Chronic pulmonary disease	2 (10%)	2 (6%)	4 (8%)
Cerebrovascular disease	0	7 (22%)	7 (13·5%)
Diabetes	2 (10%)	7 (22%)	9 (17%)

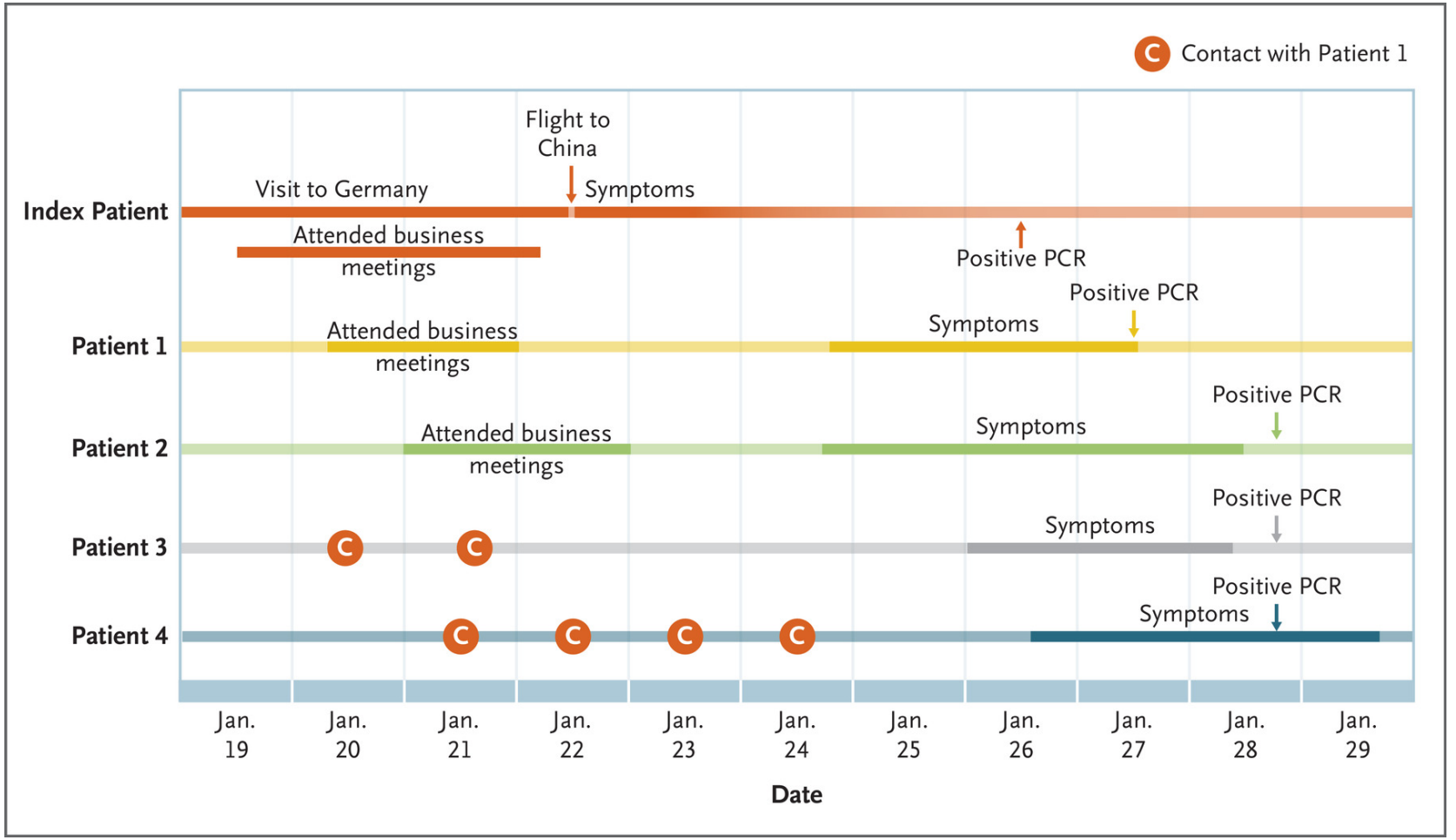
Yang et al. *Lancet Respiratory Med* 2020

Poor Outcomes of ICU Patients



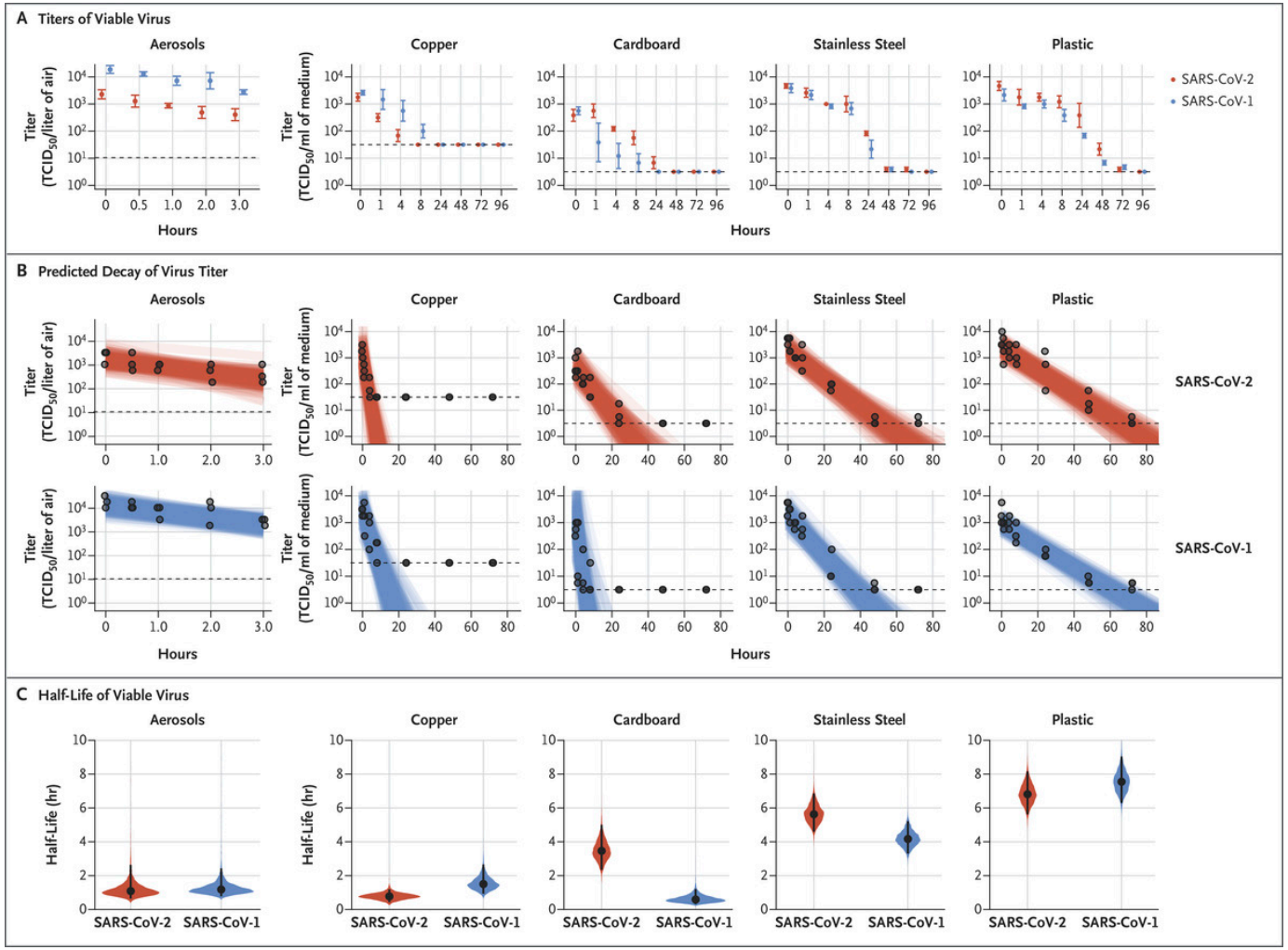
Yang et al. *Lancet Respiratory Med* 2020

Asymptomatic Patients can be Infectious



C Rothe et al. *N Engl J Med* 2020;382:970-971.

Viability of SARS-CoV-1 and SARS-CoV-2 in Aerosols and on Various Surfaces.



N van Doremalen et al. N Engl J Med 2020. DOI: 10.1056/NEJMc2004973

Infectivity of COVID 19

Values of R_0 of well-known infectious diseases[1]

Disease	Transmission	R_0
Measles	Airborne	12–18
Diphtheria	Saliva	6-7
Smallpox	Airborne droplet	5–7
Polio	Fecal-oral route	5–7
Rubella	Airborne droplet	5–7
Mumps	Airborne droplet	4–7
HIV/AIDS	Sexual contact	2–5
Pertussis	Airborne droplet	5.5[2]
SARS	Airborne droplet	2–5[3]
Influenza (1918 pandemic strain)	Airborne droplet	2–3[4]
Ebola (2014 Ebola outbreak)	Bodily fluids	1.5-2.5[5]

Conclusions

- COVID 19 is highly contagious
- R0 indicates the average number of additional individuals that one affected case infects during the course of their illness and specifically applies to a population of people who were previously free of infection and have not been vaccinated
- R0 from nCoV is 2.2, which estimated that, on average, each patient has been spreading infection to 2.2 other people
- One reason for the rapid spread may be related to the atypical symptoms in the early stage in some patients infected with nCoV
- This study did not find gender related differences in susceptibility
- No treatments were effective in this group
- 26% of patients received ICU care, and mortality was 4.3%
- Studies of ICU patients show a high mortality
- Containment is challenging due to asymptomatic shedding

Our Clinical Case

- COVID 19 test came back positive
- Patient was extubated and transferred to the floor
- His mental status never improved
- He was found in cardiac arrest and could not be resuscitated